12.3.56

FRIEDMAN & BRUYA, INC.
ENVIRONMENTAL CHEMISTS

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November 3, 1989

Mike Warfel, Project Manager
CH2M Hill Northwest
P.O. Box 91500
Bellevue, WA 98009-2050

Dear Mike:

Enclosed are the results of the analyses of samples submitted on October 31, 1989 from Project SEA24054.A0.

The main concern you expressed about these samples was that they were reported to have high 418.1 total petroleum hydrocarbons results. You wanted to determine if the hydrocarbons were biogenic in origin or from a refined petroleum product. The best way to answer this question is by determining the ratios of pristane (which shows as a doublet with n-C_{17}) phytane (which shows as a doublet with n-C_{18}). I believe that these compounds are present at comparable levels in the samples that you sent to us, which indicates a probable petrogenic origin. However, there are also signs of biogenic material, characterized by the saw-toothed shape of the chromatogram. Although the overall shape of the unresolved hydrocarbon mass is similar to that expected for a distilled diesel oil, it would be very difficult to determine how much of the contamination is due to the refined product and how much is due to biogenic products. Therefore, I have reported the results as total diesel.

You also asked if creosote or any tree preservative material would interfere with a 418.1 or our modified 8015. The oil used in creosoting processes will show as a hydrocarbon in a 418.1. Creosotes made with heavy oils do not have retention times within the same range as diesel (or heating oil) and, therefore, would not interfere with our modified 8015, but those made with kerosine or diesel as a base will certainly elute in this area.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this material, or if you just want to discuss any aspect of your projects, please do not hesitate to contact me.

Sincerely,

Jennifer L. Holmes, M.S.

JLH

Enclosures

Date of Report: November 3, 1989
Date Submitted: October 31, 1989
Project: SEA24054.A0

RESULTS OF ANALYSES OF SAMPLES FOR DIESEL BY MODIFIED 8015
Results Reported as µg/g (ppm)

Sample #	Diesel (ppm)
S10	100
W10	10
W20 Above Clay	160
N10	50
Hnu > 5 composite	90
N20	75
Hnu > 5 #2	100
W30	170
S20	90

Quality Assurance

Method Blank	<5
Hnu > 5 composite (Duplicate)	100
Hnu > 5 composite (Matrix Spike) Spiked @ 20 ppm Percent Recovery	a
Hnu > 5 composite (Matrix Spike Duplicate) Spiked @ 20 ppm Percent Recovery	a

[a] - The amount spiked was insufficient to give meaningful recovery data.